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.:cdp:Aircraft

Processing DMT Cloud Droplet Probe (CDP) data from SEA M300 file

process_raw (Level 1)

Purpose

Extracts the diagnostic data and raw channel counts from the SEA M300 data acquisition system file (*.sea). The process_raw script creates the *.counts.cdp.raw file. If particle-by-particle (pbp) data are available, extract pbp data and save them to the *.adc.cdp.raw file.

Subroutines

The process_raw script calls the IDL subroutines:

- process_WMI.pro
- cdp.pro (called by process_WMI.pro)
- create_cdp_header.pro (called by cdp.pro)
- create_cdp_pbp_header.pro (called by cdp.pro)

Required Input Files

*.sea

Output Files

Among many other files, it generates:

- *.counts.cdp.raw

Syntax

```
process_raw <-d> <-v> <-vm> input_file
```

Example Syntax

```
process_raw ${CoPAS_DIR}/ADTAE/TestData/FlightData/20140429_152103/PostProcessing/14_04_29_15_21_03.sea
```

cdp_counts2conc (Level 3)

Purpose

Calculates the concentration of cloud droplet particles based on the CDP channel counts and the true air speed. Also calculates bulk parameters such as liquid water content, mean diameter, etc.

Required Input Files

- *.counts.cdp.raw
- *.basic.raw

Optional Input Files

.serialB.aimms.

Optional Keywords

- fast - skips long duration processing
- final - causes output data to be tagged with 'Final' instead of 'Preliminary' for data type.
- csh_error - errors are returned to the shell calling program instead of occurring in the IDL code.
- tas - the true air speed [m/s] to use instead of values from the basic_file.

Output files

*.conc.cdp.raw

Syntax

```
cdp_counts2conc <fast> <final> <csh_error> <tas = value> CDP_counts_file <basic_file> <serialB.aimms_file>
```

Examples

```
cdp_counts2conc 21_11_18_05_31_30.counts.cdp.raw 21_11_18_05_31_30.basic.4Hz
```

avgfields: *.conc.cdp.raw to *.conc.cdp.1Hz (Level 3)

Purpose

To average the data to convert from a higher sampling frequency to a lower frequency (i.e. from 4 samples per second to 1 sample per second).

Required Input Files

- *.conc.cdp.raw

Require Keyword Input

- points - the number of samples to average per new unit of sampling frequency.

Output files

*.conc.cdp.1Hz

Syntax

```
avgfields points=${freq} < ${namebase}.conc.cdp.raw > ${namebase}.conc.cdp.1Hz
```

Example

```
avgfields points=4 < 21_11_18_05_31_30.conc.cdp.raw > 21_11_18_05_31_30.conc.cdp.1Hz
```

mergefield: *.adc.cdp.raw to *.adc_tas.cdp.raw (Level 4)

Purpose

To merge true air speed data from the *.basic.raw file into the *.adc.cdp.raw to create the *.adc_tas.cdp_raw file.

Required Input Files

- *.basic.raw
- *.adc.cdp.raw

Required Keyword Input

- field - the column number(s) of the desired data.
- target - the column number(s) of the target locations for the desired data in the receiving file.
- tolerance - the time tolerance (in seconds) to be allowed for matching times within the receiving file.

Output File

- *.adc_tas.cdp.raw

Syntax

```
mergefield field=4 target=5 tolerance=0.02 fill=older file=${namebase}.basic.${basic_suff} < ${namebase}.adc.cdp.${adc_suff} > ${namebase}.adc_tas.cdp.raw
```

Example

```
mergefield field=4 target=5 tolerance=0.02 fill=older file=21_11_18_05_31_30.basic.raw < 21_11_18_05_31_30.adc.cdp.raw > 21_11_18_05_31_30.adc_tas.cdp.raw
```

adc2vol.py (Level 4)

Purpose

To calculate the ADC CDP particles per volume.

Required Input File

*.adc_tas.cdp.raw

Output File

*.adc_tas_vol.cdp.raw

Syntax

```
adp2vol.py filename
```

Example

```
adp2vol.py 15_08_08_14_57_48.adc_tas.cdp.raw
```